

1. 4024/11/M/J/16 Q17

17 (a)	10, 12	1	
(b)	$2n + 2$	1	
(c)	99	2 *	M1 for <i>their</i> (b) = 200

2. 4024/12/M/J/16 Q25

25 (a) (i)	-6	1	
(ii)	15	2*	C1 for $15^2 - 5 \times 15$ or for 15, -10 OR M1 for $(p + 10)(p - 15) [= 0]$
(b)	4	2*	B1 for $3 \times 5^2 - 5k = 55$ oe

3. 4024/11/O/N/16 Q23

23 (a)	7, 21	1	
(b)	$2n - 1$ oe	1	
(c)	FT $3 \times$ <i>their</i> (b) provided this is a function of n ; or $6n - 3$ oe	1 ✓	
(d) (i)	48	1	
(ii)	$3n^2$	2 *	M1 for a sensible method, e.g. writing terms as $3 \times 1, 3 \times 4, 3 \times 9, \dots$ or B1 for $An^2 + Bn + C, A \neq 0$ from a valid method.

4. 4024/12/O/N/16 Q26

26 (a) (i)	$2n - 1$ oe	1	
(ii)	421	1	
(b) (i)	8	1	
(ii)	14	1	

5. 4024/21/M/J/17 Q8

8(a)	Correct diagram	1	
8(b)	22 26 88 130	2	B1 for 2 or 3 correct
8(c)	$4n + 6$ oe isw	2	B1 for $4n \pm k$
8(d)	26	1	
8(e)	$(2n + 3)(2n + 2)$ leading to $4n^2 + 10n + 6$ with no errors	2	B1 for either $(2n + 3)$ or $(2n + 2)$ used After 0, SC1 for $4n^2 + 10n + 6$ shown using alternative method
8(f)	$4n^2 + 6n$ oe	1	
8(g)	7 cao	3	M1 for $4p^2 + 10p + 6 = 8 \times \text{their } (4p + 6)$ A1 for $4p^2 - 22p - 42 [= 0]$ oe or B2 for $[p = 7]$ total 272 grey 272 or B1 for $[p = 6]$ total 240 grey 240

6. 4024/22/M/J/17 Q7

7(a)	Correct pattern drawn	1	
7(b)	15 21 10 15	2	B1 for 2 or 3 correct
7(c)	n^2 oe final answer	1	e.g. $(\frac{1}{2}n^2 + \frac{1}{2}n) + (\frac{1}{2}n^2 - \frac{1}{2}n)$
7(d)	465	1	
7(e)	$n^2 - (\frac{1}{2}n^2 + \frac{1}{2}n)$ or $(\frac{1}{2}(n-1)^2 + \frac{1}{2}(n-1))$ or $(\frac{1}{2}n^2 + \frac{1}{2}n) - n$ leading to $(\frac{1}{2}n^2 - \frac{1}{2}n)$ without error AG	1	
7(f)	$m = 9$ cao	3	M1 for $\frac{1}{2}m^2 + \frac{1}{2}m = 5m$ A1 for $m^2 - 9m = 0$ or $m^2 = 9m$ or $m - 9 = 0$ or $m + 1 = 10$ or B2 for $[m = 9]$ $5m = 45$ and crosses = 45 or B1 for values for $5m$ and the number of crosses seen for at least $m = 7$ and 8 After 0, SC1 for answer 11

7. 4024/11/O/N/17 Q25

25(a)	11, 36	1	
25(b)(i)	$2N+1$	1	
25(b)(ii)	$(N+1)^2$ oe	1	
25(c)	169	2	B1 for <i>their (b)(i)</i> = 25; or for $N = 12$

8. 4024/12/O/N/17 Q26

26(a)	49, 19, 30	1	
26(b)(i)	$3n + 4$ oe and isw	1	
26(b)(ii)	$(n + 2)^2$ oe	1	
26(c)	$n^2 + n$; or $n(n + 1)$	2	M1 for attempt at <i>their(bii)</i> – <i>their(bi)</i> , provided both parts are different expressions in n , and the answer space also contains an expression in n , or is empty: or for a valid method.

9. 4024/12/M/J/18 Q21

21(a)	71	1	
21(b)	$[p =] 2$ $[q =] 1$	1	Both correct
21(c)	$A = 2$ $B = 4$ $C = 1$	2	B1 for two correct or for $(n + 1)^2 = n^2 + 2n + 1$ or for $(n + \textit{their } q)^2 = n^2 + 2n(\textit{their } q) + (\textit{their } q)^2$ $A + B + C = 7$ or M1 for $4A + 2B + C = 17$ $9A + 3B + C = 31$

10. 4024/21/M/J/18 Q5

5(a)(i)	$6n - 5$ oe	2	M1 for $6n + k$ oe with $k \neq 0$
5(a)(ii)	256 is not exactly divisible by 6 or 247 in sequence and next one is 253 oe	1	
5(b)(i)	$p^2 - 3$ oe	1	
5(b)(ii)	$p^2 + 2p + 4$ oe	1	
5(c)(i)	Correct drawing	1	
5(c)(ii)	28, 40	2	B1 for one correct
5(c)(iii)	$t^2 + 3t$ oe	2	B1 for $t^2 + \dots$

11.4024/11/O/N/18 Q7

7(a)	9	1	
7(b)	$4n + 5$ cao	2	B1 for $4n + k$ oe

12.4024/12/O/N/18 Q11

11(a)	$\frac{23}{24} \frac{27}{28}$	1	
11(b)	300	1	
11(c)	$\frac{4n-1}{4n}$ oe	2	B1 for $\frac{\dots}{4n}$, or for $4n - 1$ oe

13.4024/21/O/N/18 Q8

8(a)	$\frac{n+5}{n+10}$	1	Both correct
8(b)(i)	$(n+5)^2$ and $n(n+10)$	M1	
8(b)(ii)	$n^2 + 5n + 5n + 25 - n^2 - 10n = 25$	A1	or $n^2 + 10n - n^2 - 5n - 5n - 25 = -25$
8(c)	63	3	M1 for $n + n + 5 + n + 10 = 174$ oe A1 for $n = 53$ If 0 scored, SC1 for answer 53

14.4024/11/M/J/19 Q12

12(a)	11	1	
12(b)	16	1	

15.4024/12/M/J/19 Q22

22(a)	9 12 15 12 17 22	2	B1 for one row correct
22(b)	$5n - 3$ oe final answer	2	B1 for $5n + k$ oe seen
22(c)	57	2	M1 for <i>their</i> $(5n - 3) = 92$ or B1 for $n = 19$ soi or for answer 19

16. 4024/21/O/N/19 Q6

6(a)	24 35	1	
6(b)	$n(n+2)$ oe	2	B1 for quadratic expression in n
6(c)(i)	35	3	B2 for 35×37 or 35.8 to 35.9 OR M1 for <i>their</i> $n(n+2) = 1358$ M1 for solution of <i>their</i> quadratic $\frac{-2 \pm \sqrt{2^2 - 4 \times 1 \times (-1358)}}{2 \times 1}$
6(c)(ii)	7	2	M1FT for $1358 - \text{their (c)(i)} \times (\text{their (c)(i)} + 2)$

17.4024/11/M/J/20 Q23

3	(0).5 4.1	2	B1 for each or M1 for difference = (0).9 soi
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18.4024/11/M/J/20 Q23

23(a)	54	1	
23(b)(i)	$\frac{36}{11}$	1	
23(b)(ii)	$\frac{(n+1)^2}{2n+1}$ oe	3	B2 for $2n + 1$ oe OR B1 for $(n + 1)^2$ oe B1 for $2n$ associated with 3, 5, 7, 9

19.4024/11/O/N/20 Q18

18(a)	11 11 11 11 11 11	1	
18(b)	$2n + 1$ oe final answer	1	
18(c)	$n + 1$ oe final answer	1	
18(d)	$(2n + 1)(n + 1)$; or $2n^2 + 3n + 1$ oe	1	FT <i>their (b) × their (c)</i> provided both answers are in terms of n

20.4024/12/O/N/20 Q20

20(a)	Rectangle with base 7 dots, height 5 dots	1									
20(b)(i)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>3</td><td>4</td></tr> <tr><td>4</td><td>5</td></tr> <tr><td>5</td><td>7</td></tr> <tr><td>20</td><td>35</td></tr> </table>	3	4	4	5	5	7	20	35	1	
3	4										
4	5										
5	7										
20	35										
20(b)(ii)	$n + 1$ oe final answer	1									
20(b)(iii)	$2n - 1$ oe final answer	1									
20(b)(iv)	$(n+1)(2n-1)$ or $2n^2 + n - 1$ oe	1	FT <i>their(b)(ii) × their(b)(iii)</i> provided both in terms of n only								

21.4024/12/M/J/21 Q20

20	$\frac{5n+7}{(n+3)^2}$ oe final answer	4	B2 for n th term for numerator sequence $5n + 7$ oe final answer or B1 for $5n + k$ oe seen AND B2 for n th term for denominator sequence $(n + 3)^2$ oe final answer or B1 for quadratic expression in n seen for denominator sequence Maximum 3 marks if final answer incorrect
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22.4024/11/O/N/21 Q20

20(a)	128	1	
20(b)(i)	$2^{n+1} - 3$ final answer	1	
20(b)(ii)	$2^{n+1} + 5n + 1$ oe final answer	2	B1 for $2^{n+1} + 5n + k$ oe or M1 for 6 11 16 21 [26]

23. 4024/22/O/N/21 Q4

4(a)(i)	20 24	1	Both correct
4(a)(ii)	$4n + 4$ oe final answer	2	B1 for $4n + k$ oe seen
4(a)(iii)	36	2	M1 for <i>their</i> $(4p + 4) = 150$ soi
4(b)(i)	44	2	M1 for $\frac{26-2}{4}$ or difference = $[-]6$
4(b)(ii)	$50 - 6n$ oe final answer	2	B1 for $-6n + k$ oe seen

24. 4024/12/M/J/22 Q9

9(a)	14 17	1	
9(b)	$3n + 2$ oe final answer	2	B1 for $3n + k$ oe seen or for $jn + 2$ oe seen $j \neq 0$
9(c)	12	3	M1 for substitution of 20 into <i>their</i> $(3n + 2)$ or for 62 seen or for 38 seen M1 for <i>their</i> $(3k + 2) = 100 - \textit{their}$ 62

25. 4024/21/M/J/22 Q2

2(a)	18 22 32 50 50 72	2	B1 for one row or column correct
2(b)	$4n + 2$ oe final answer	2	B1 for $4n + k$ oe seen
2(c)	24	2	M1 for <i>their</i> $(4k + 2) = 98$
2(d)	$2n^2$ oe final answer	2	B1 for answer $kn^2 + \dots, k \neq 0$ or second difference = 4 soi
2(e)	882	2	M1 for $2 \times 20^2 + 4 \times 20 + 2$ oe or $n = 20$ substituted into <i>their</i> (b) + <i>their</i> (d) oe

26. 4024/11/O/N/22 Q13

13(a)	2, 11, 26	2	B1 for any two correct If 0 scored, SC1 for answer -1, 2, 11
13(b)	3^{n-1} oe final answer	2	B1 for answer 3^k where k is $f(n)$ or for correct answer seen and spoilt